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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,908	02/10/2004	Leonard Forbes	400.272US01	1212

27073 7590 01/26/2006

LEFFERT JAY & POLGLAZE, P.A.
P.O. BOX 581009
MINNEAPOLIS, MN 55458-1009

EXAMINER	
HO, TU TU V	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/775,908	FORBES, LEONARD	
	Examiner	Art Unit	
	Tu-Tu Ho	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 35-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 35-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/11/2006 has been entered.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 35, and 37-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Choi et al. U.S. Patent Application Publication 20030153151 (hereinafter the '151 reference).

Referring to **claim 1**, the reference discloses an NROM memory transistor (paragraph [0037], nitride-based "read only memory") comprising:

a substrate (11, Figs. 1-5, particularly Fig. 1) having a plurality of source/drain regions (13/15), the source/drain regions having a different conductivity type than the remainder of the substrate (paragraph [0030]);

a nanolaminate gate dielectric (23/27/21) formed on top of the substrate substantially between the plurality of source/drain regions, the gate dielectric composed of oxide-nitride-HfO_2 (silicon oxide – silicon nitride – hafnium oxide HfO_2 , paragraphs [0031] and [0046]); and

a control gate (17) formed on top of the gate dielectric.

Referring to **claims 35 and 37**, the reference further discloses that the plurality of source/drain regions are comprised of an n+ type doped silicon in the p-type silicon (paragraph [0030]).

Referring to **claims 38-40**, the limitations "fabricated using atomic layer deposition", "fabricated using an evaporation technique", and "fabricated using a combination of an atomic layer deposition and an evaporation technique" in the limitations "wherein the nanolaminate gate dielectric is fabricated using atomic layer deposition", "wherein the nanolaminate gate dielectric is fabricated using an evaporation technique", and "wherein the nanolaminate gate dielectric is fabricated using a combination of an atomic layer deposition and an evaporation technique" are taken to be product-by-process limitations and considered non-limitation in the product claims (MPEP 2112.01 and MPEP 2113). Specifically, in the instant case, characteristics of the claimed nanolaminate gate dielectric have not been positively established.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 36 and 41-44** are rejected under 35 U.S.C. §103(a) as being unpatentable over Choi et al. U.S. Patent Application Publication 20030153151 (the '151 reference).

Referring to **claims 41 and 44**, the '151 reference discloses an NROM memory transistor as claimed and as detailed above for claim 1, but does not teach that the NROM memory transistor could be formed as a memory array including an array of the NROM memory

transistors, and further does not teach that the memory array could be used in an electronic system including a processor and a memory device. However, as the reference also does not exclude such usage, such utilization of the NROM memory transistor in an array and eventually in an electronic system would have been obvious to one of ordinary skill in the art at the time the invention was made.

Referring to **claim 43**, the reference further discloses that the substrate is silicon (paragraph [0030]). Referring to **claims 36 and 43**, although the reference does not disclose that the control gate is a polysilicon material, at the time the invention was made, polysilicon material and a material including a metal were two known and available materials to form control gates; therefore, selecting such known and available materials would have been obvious to one of ordinary skill in the art.

Referring to **claim 42**, the reference further discloses that the pair of source/drain regions are n+ doped regions in a p-type substrate (paragraph [0030]).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tu-Tu Ho
January 20, 2006